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EXAMINER

PADMANABHAN, KARTIC

ART UNIT PAPER NUMBER

1641

DATE MAILED: 04/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/848,777

Applicant(s)

AUDEH ET AL.

Examiner

Kartic Padmanabhan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 February 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 6-16, 18-21 and 30-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6-16, 18-21 and 30-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claims 14 and 18 are objected to because they are duplicates of one another. Applicant is required to cancel the claim(s) or amend the claim(s) to place the claim(s) in proper dependent form.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

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invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 6, 10-14, 16, 18-21, and 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Ness et al. (US Pat. 5,667,976) in view of Grieve et al. (US Pat. 6,391,569 B1).

Van Ness et al. teach solid supports for nucleic hybridization assays, wherein nylon coated magnetic beads may be used (abstract and Col. 14). Oligonucleotides are immobilized via covalent attachment onto the beads and serve as probes (abstract and claim 1). The beads may be employed free in solution (abstract). The reference also teaches that the oligonucleotides immobilized on the beads can serve as electrophiles for the covalent attachment of proteins and antibodies. In addition, labels, such as colored labels (dyes), may be used in the hybridization assays. However, the reference does not teach immobilization of proteins.

Grieve et al. teach the immobilization of a protein on a solid support or matrix, which may be particulate such as nylon, nitrocellulose, or PVDF. Beads may be used as the substrate of the reference. The immobilized protein of the reference is used to bind antibody.

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to immobilize proteins on beads as taught by Grieve et al. with the composition of Van Ness et al. because Grieve et al. teach that proteins may be immobilized on solid supports, such as beads. As such, one would have had a reasonable expectation of success in immobilizing proteins instead of oligonucleotides on the beads of Van Ness et al. It would have also been obvious to one of ordinary skill in the art at the time of the invention to remove the liquid in the modified colloidal suspension of Van Ness et al. and Grieve et al. and arrive at a powdered form

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because powder is well known in the art to have greater stability and shelf life in comparison to a liquid form. In addition, such a form is easier to package in a kit, which provides increased convenience and economy. Also, a powder form may be easily reconstituted, as necessary, prior to use. Further, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to change the size of the particles to be within the range of the claims as an obvious matter of design choice. Such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955). Finally, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to immobilize molecules to the modified particles Van Ness et al. and Grieve et al. via non-covalent or electrostatic binding, as well as adsorption because all are well-known immobilization methods in the art, and one of skill would have had a reasonable expectation of success in using any of these methods to immobilize the molecules onto particles.

6. Claims 6-13, 16, 19-21, 30-32 rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai et al. (US Pat. 5,194,372) in view of Grieve et al. (US Pat. 6,391,569 B1)

Nagai et al. teach methods for detecting disorders, wherein fine particles in solution have at least two types of nucleic acid singles stranded probes immobilized thereon. The probes are complementary to first and second regions, respectively, and are exclusive of each other (see claim 1). However, the reference does not teach immobilization of proteins.

Grieve et al. teach the immobilization of a protein on a solid support or matrix, which may be particulate such as nylon, nitrocellulose, or PVDF. Beads may be used as the substrate of the reference. The immobilized protein of the reference is used to bind antibody.

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It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to immobilize proteins on beads as taught by Grieve et al. with the composition of Nagai et al. because Grieve et al. teach that proteins may be immobilized on solid supports, such as beads. As such, one would have had a reasonable expectation of success in immobilizing proteins instead of single strand nucleic acids on the particles of Nagai et al.

It would have also been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to use nitrocellulose, PVDF, or nylon as the matrix material, since Grieve et al. teach the immobilization of proteins on these materials, and it has also been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416. Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention to remove the liquid in the modified colloidal suspension of Nagai et al. and Grieve et al. and arrive at a powdered form because powder is well known in the art to have greater stability and shelf life in comparison to a liquid form. In addition, such a form is easier to package in a kit, which provides increased convenience and economy. Also, a powder form may be easily reconstituted, as necessary, prior to use. Further, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to change the size of the particles to be within the range of the claims as an obvious matter of design choice. Such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955). Finally, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to immobilize molecules to the modified particles Nagai et al. and Grieve et al. via

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non-covalent or electrostatic binding, as well as adsorption because all are well-known immobilization methods in the art, and one of skill would have had a reasonable expectation of success in using any of these methods to immobilize the molecules onto particles.

7. Claims 6-16, 18-21, and 30-32 rejected under 35 U.S.C. 103(a) as being unpatentable over Delair et al. (US Pat. 6,033,853) in view of Grieve et al. (US Pat. 6,391,569 B1)).

Delair et al. teach a kit for detecting a nucleic acid sequence comprising a labeled nucleotide probe and a reagent consisting essentially of a suspension of insoluble particles on which at least one series of oligonucleotides are immobilized. The kit may be used in hybridization assays (abstract). The size of the particle may range from 50 nm to 5µm (claim 7). The oligonucleotide probes may be immobilized on the particle via covalent binding or adsorption, and the label may be any known in the art, such as colored labels. However, the reference does not teach immobilization of proteins.

Grieve et al. teach the immobilization of a protein on a solid support or matrix, which may be particulate such as nylon, nitrocellulose, or PVDF. Beads may be used as the substrate of the reference. The immobilized protein of the reference is used to bind antibody.

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to immobilize proteins on beads as taught by Grieve et al. with the composition of Delair et al. because Grieve et al. teach that proteins may be immobilized on solid supports, such as beads. As such, one would have had a reasonable expectation of success in immobilizing proteins instead of oligonucleotides on the particles of Delair et al. It would have also been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to use nitrocellulose, PVDF, or nylon as the matrix material, since Grieve et al. teach the

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immobilization of proteins on these materials, and it has also been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416. Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention to remove the liquid in the modified colloidal suspension of Delair et al. and Grieve et al. and arrive at a powdered form because powder is well known in the art to have greater stability and shelf life in comparison to a liquid form. In addition, such a form is easier to package in a kit, which provides increased convenience and economy. Also, a powder form may be easily reconstituted, as necessary, prior to use. Further, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to change the size of the particles to be within the range of the claims as an obvious matter of design choice. Such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955). Finally, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to immobilize molecules to the modified particles Delair et al. and Grieve et al. via non-covalent or electrostatic binding because both are well-known immobilization methods in the art, and one of skill would have had a reasonable expectation of success in using any of these methods to immobilize the molecules onto particles.

8. Claims 6, 10-13, 16, 19-21, 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawaguchi et al. (US Pat. 5,122,600) in view of Grieve et al. (US Pat. 6,391,569 B1).

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Kawaguchi et al. teach DNA immobilized microspheres, wherein the particle has a diameter of 0.1-50 μM . Protein may be adsorbed to the DNA immobilized particles for protein purification. DNA may be attached to the particles via adsorption or covalent attachment. However, the reference does not teach immobilization of proteins.

Grieve et al. teach the immobilization of a protein on a solid support or matrix, which may be particulate such as nylon, nitrocellulose, or PVDF. Beads may be used as the substrate of the reference. The immobilized protein of the reference is used to bind antibody.

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to immobilize proteins on beads as taught by Grieve et al. with the composition of Kawaguchi et al. because Grieve et al. teach that proteins may be immobilized on solid supports, such as beads. As such, one would have had a reasonable expectation of success in immobilizing proteins instead of DNA on the particles of Kawaguchi et al. It would have also been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to use nitrocellulose, PVDF, or nylon as the matrix material, since Grieve et al. teach the immobilization of proteins on these materials, and it has also been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416. Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention to remove the liquid in the modified colloidal suspension of Kawaguchi et al. and Grieve et al. and arrive at a powdered form because powder is well known in the art to have greater stability and shelf life in comparison to a liquid form. In addition, such a form is easier to package in a kit, which provides increased convenience and economy. Also, a powder form may be easily reconstituted, as necessary, prior to use. Further,

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it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to change the size of the particles to be within the range of the claims as an obvious matter of design choice. Such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955). Finally, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to immobilize molecules to the modified particles Kawaguchi et al. and Grieve et al. via non-covalent binding because it is a well-known immobilization method in the art, and one of skill would have had a reasonable expectation of success in using such a methods to immobilize the molecules onto particles.

9. Claims 6-16, 18-21, and 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seul (WO 97/40385).

The reference teaches the manipulation of colloidal particles, wherein the particles may be 1 or 10 microns in diameter (page 55). A plurality of types of molecules may be attached to the surfaces of the particles, wherein each particle has a plurality if particle of one type (page 58). The molecules may be oligonucleotides or protein. The particle or beads may also be labeled by any known conventional label, including colored labels. However, the reference does not teach specific matrix materials, a powder form, or specific immobilization techniques.

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to use nitrocellulose, PVDF, or nylon as the matrix material, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416. Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the

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invention to remove the liquid in the colloidal suspension of Seul et al. and arrive at a powdered form because powder is well known in the art to have greater stability and shelf life in comparison to a liquid form. In addition, such a form is easier to package in a kit, which provides increased convenience and economy. Also, a powder form may be easily reconstituted, as necessary, prior to use. Finally, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to immobilize molecules to the particles of Seul et al. via covalent, non-covalent, electrostatic, or adsorptive techniques because all are well known immobilization methods in the art, and one of skill would have had a reasonable expectation of success in using any of these methods to immobilize the molecules onto particles.

Response to Arguments

10. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection. It is noted that the claim objection from the previous office action has been maintained, as applicant has not amended or cancelled the claims, nor even addressed the issue in the response to the office action.

11. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

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12. Applicant argues that the Wagner reference teaches only the immobilization of mismatch binding proteins, and cannot be applied to proteins in general, and applicant's amendment requiring a biologically active molecule overcome this reference. This argument has been rendered moot since this reference has been withdrawn as a secondary reference, and Grieve has been applied as a secondary reference to cure the deficiency in the primary references. Grieve clearly teaches a biologically active biomolecule, as the immobilized protein of the reference is used to bind antibody.

13. Finally, it is noted that, contrary to applicant's characterization, Seul has been applied under 35 USC 103 individually and not in combination with Wagner. As such, applicant's arguments with respect to the combination of Seul and Wagner are off point. Therefore, since applicant has not properly responded to the 103 rejection over Seul, the rejection over that reference has been maintained.

Conclusion

Claims 6-16, 18-21, and 30-32 are rejected.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kartic Padmanabhan whose telephone number is 571-272-0825. The examiner can normally be reached on M-F (8:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on 571-272-0823. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kartic Padmanabhan
Patent Examiner
Art Unit 1641



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04/05/07